

DMP / DR - IRP 2010 Input Parameter information sheet (Demand input)

This sheet is to be used as the primary stakeholder engagement tool. This document provides the information that will allow the stakeholders to make a meaningful contribution to the IRP Input parameters.

Parameter	Demand Market Participation (DMP) & Demand Response (DR) including other on-the-day dispatchable load reduction solutions
Purpose	<p>DR initiatives are considered the lowest cost option of “virtual new capacity” and are realised when customers reduce their demand on request by the system operator.</p> <p>When Demand outstrips Supply, for whatever reason, the System Operator has only two choices: either bring more generation on line if available, or to request/take load off the system. DR programs allow the system operator to manage the balance between supply and demand not only using supply side options but, striking a cost effective balance between generating more electricity vs. reducing the demand for electricity.</p> <p>Internationally it is recognized that demand response can play a bigger role in economically balancing this equation and keep the system frequency at an acceptable level. Building new generation most often leads to an increase in cost to the industry (burning fuel, ultimately resulting in higher tariffs; in particular if high marginal cost generation options have to be dispatched), whereas load reduction contains the cost (and payment) of such services within the industry, to further enhance flexibility for the System Operator.</p>
Impact on the IRP	<p>Though DR normally relates to a peaking type resource (limited energy, short notice and limited continuous operation), DR can also provide a limited energy, mid-merit type solution (8-12 hours a day).</p> <p>Note: In this parameter DR does not include traditional EE and Demand Side Management (DSM) which is dealt with in a separate “EE & DSM - IRP 2010 Input</p>

	<p>Parameter information sheet”.</p> <p>DSM programs traditionally have fixed hours during which load is reduced, irrespective of real time system tightness, and aim to (semi)permanently change the shape of the national load profile. DR programs on the contrary make demand reduction available to the System Operator to be called on only when needed, thus extending the System Operator’s basket of options to manage on-the-day Demand / Supply balance. DR is an Ancillary Service resource that doesn’t seek to change the national profile, but releases supply side options that needed to be held in reserve for balancing the system and/or manage emergency situations.</p> <p>As an option / category in the IRP program, DR offers an economically viable alternative to Open Cycle Gas Turbines (OCGT) and/or pumped storage projects.</p>
The assumptions included in establishing the parameter values in this sheet	<p>It is firstly assumed that the value of DR to the SO will remain high enough to ensure consumers of electricity would be interested in selling their flexibility to the System Operator. In addition it is assumed more users, especially smaller users, will participate through an independent intermediary, specialising in such services.</p> <p>Secondly, it is assumed that the Ancillary Services will always need peaking capacity and that through contracting more DR from consumers with loads smaller than those currently participating in DMP, DR will become a more reliable / bankable resource to the Ancillary Services. This will see DR taking its rightful place as an alternative to building other peaking plant, and not only supplying cheaper alternatives when available.</p> <p>It is further assumed that load reduction through DR, especially when contracted with smaller loads, will mostly result in permanent reduction and lastly, it is assumed that a strategic partner will be found and/or Eskom will be allocated the necessary funds by NERSA to implement the findings of the Potential Study described under Parameter Value below.</p>
Parameter Value	<p>The real-time monetary value of DR to the SO varies depending on the tightness of the national system, the position of the DR resource in the deployment order</p>



and next option available to the System Operator at the time.

It is contemplated that during periods of low risk for load shedding, the value of DR can mostly be linked to the avoidance of running OCGTs; therefore OCGT marginal cost. Should time allow, and more peaking capacity is needed, the value of DR is avoidance of building and running additional OCGTs; therefore both OCGT marginal cost and capital investments. During periods of high probability for load shedding, the value of DR shoots up to the cost and inconvenience that industry and the country as a whole would experience during load shedding events; i.e. the Cost of Unserved Energy.

The value of DR vs. other peaking type options however spans much wider.

Besides the fact that DR normally has a lower cost to establish and operate than for example OCGTs, DR also has huge environmental and strategic value, which inter alia include:

- Positive environmental footprint if compared to most other peaking options; especially OCGTs,
- Sending the correct environmental / renewable signals to investors and industry (existing and new plant), as supported by the South African Government,
- Following international trends in utilising reduction in Demand for balancing demand and supply, as opposed to generating more electricity when Demand outstrips Supply,
- Introducing a form of price elasticity in the South African electricity industry,
- Supporting energy efficiency, conservation and DSM initiatives through focusing attention on consumption and plant flexibility, as well as
- Providing an income stream to consumers of electricity (from the electricity industry itself) to reinvest in metering, control and management of consumption - creating a more involved, self regulating, resilient industry.

Over the last few years, the DMP program has successfully managed to provide the System Operator with 300-500MW of DR, of which about 160MW has a load

	<p>factor above 40% and the rest a load factor of about 8% (2h/day, capped at 600h/a).</p> <p>A Potential Study conducted by an international company in 2009 suggested that an additional 3000MW of DR is available in South Africa as a peaking solution (8% load factor) and at a cost below that of building and operating OCGTs. Though still energy limited and of a lesser quantum, these resources can also be utilized as a mid-merit option if dispatched differently (1000MW, 20-35% load factor).</p> <p>The Potential Study excluded existing DMP contracts and though in principle it will provide the System Operator with Ancillary Service options very similar to DMP, technologies and dispatch mechanisms may be very different. Attaining the mentioned DR will require capital investment, but will in return result in a more robust, sustainable resource. This will provide South Africa with a bankable DR program for at least 15-20 years.</p>
Range of Parameter Value	<p>Contracting DR from smaller customers normally results in higher capital investment and operating cost per MW, but on the other hand brings diversity and sustainability. The price at which DR can be established and made available to the System Operator, will increase as the program gets rolled out to smaller consumers. This might mean that some DR resources are offered as supplemental reserves and others as Emergency reserves.</p>
Preconditions necessary to make possible for this parameter to be included in the IRP	<p>For DR to be included in the IRP plan the requisite purchasing and capital costs must be provided together with any long-term contract with a strategic partner that might be willing to invest and recover its capital over a 15-20 year contract. In addition, provision has to be made for funds to operate these DR resources (as approved by NERSA in Eskom's revenue applications)</p> <p>Extent of DMP participation is in direct proportion to the price paid to the participants.</p>
Parameter Owner	Eskom